L Number	Hits	Search Text	DB	Time stamp
1	224	(cantilever or AFM) same (external adj1 force)	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:22
2	166	((cantilever or AFM) same (external adj1 force)) and @py<2003	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:19
3	0	((cantilever or AFM) same (external adj1 force)) same binding	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:19
4	4	(((cantilever or AFM) same (external adj1 force)) and @py<2003) and binding	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:20
5	24	(cantilever or AFM) same (no near4 external near2 force)	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:23

L Number	Hits	Search Text	DB	Time stamp
1	224	(cantilever or AFM) same (external adj1 force)	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:18
2	166	((cantilever or AFM) same (external adj1 force)) and @py<2003	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:19
3	0	((cantilever or AFM) same (external adj1 force)) same binding	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:19
4	4	(((cantilever or AFM) same (external adj1 force)) and @py<2003) and binding	USPAT; US-PGPUB; EPO; DERWENT	2004/07/16 09:20

FILE 'MEDLINE' ENTERED AT 09:06:34 ON 16 JUL 2004

FILE 'EMBASE' ENTERED AT 09:06:34 ON 16 JUL 2004

FILE 'USPATFULL' ENTERED AT 09:06:34 ON 16 JUL 2004

=> manalis s/au
L1 3 FILE CAPLUS
L2 0 FILE BIOSIS
L3 0 FILE MEDLINE
L4 0 FILE EMBASE
L5 0 FILE USPATFULL

TOTAL FOR ALL FILES
L6 3 MANALIS S/AU

=> d l6 ibib abs total

L6 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1996:266517 CAPLUS
TITLE: Submicron characterization of recording media using magnetic force microscopy (invited) (abstract)
AUTHOR(S): Babcock, K.; **Manalis, S.**; Elings, V.; Dugas, M.; Challener, W.
CORPORATE SOURCE: Digital Instruments, Santa Barbara, CA, 93103, USA
SOURCE: Journal of Applied Physics (1996), 79(8, Pt. 2B), 6440
CODEN: JAPIAU; ISSN: 0021-8979
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal; Miscellaneous
LANGUAGE: English
AB Unavailable

L6 ANSWER 2 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1994:170178 CAPLUS
DOCUMENT NUMBER: 120:170178
TITLE: Nanowire array composites
AUTHOR(S): Huber, C. A.; Huber, T. E.; Sadoqi, M.; Lubin, J. A.; **Manalis, S.**; Prater, C. B.
CORPORATE SOURCE: Res. Technol. Dep., Nav. Surf. Warf. Cent., Silver Spring, MD, 20903, USA
SOURCE: Science (Washington, DC, United States) (1994), 263(5148), 800-2
CODEN: SCIEAS; ISSN: 0036-8075
DOCUMENT TYPE: Journal; General Review
LANGUAGE: English
AB A review with 18 refs. Long, nanometer-size metallic wires can be synthesized by injection of the conducting melt into nanochannel insulating plates. Large-area arrays of parallel wires 200 nm in diameter and 50 μm long with a packing d. 5 + 108 per square centimeter were fabricated in this way. When charged, the ends of the wires generate strong, short-range elec. fields. The nanowire elec. fields were imaged at high spatial resolution with a scanning force microscope.

L6 ANSWER 3 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1993:673469 CAPLUS
DOCUMENT NUMBER: 119:273469
TITLE: Characterization of poly(acrylic acid)-modified zinc phosphate crystal conversion coatings
AUTHOR(S): Wragg, J. L.; Chamberlain, J. E.; Chann, L.; White, H. W.; Sugama, T.; **Manalis, S.**
CORPORATE SOURCE: Dep. Phys. Astron., Univ. Missouri, Columbia, MO,

65211, USA
SOURCE: Journal of Applied Polymer Science (1993), 50(5), 917-28
CODEN: JAPNAB; ISSN: 0021-8995
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Raman spectroscopy and atomic force microscopy were used to investigate the composition and surface structure of poly(acrylic acid)(I)-modified zinc phosphate crystal conversion coatings on steel. Addition of high-mol. weight I to the phosphating bath can significantly improve both resistance to corrosion and topcoat adherence. Raman spectra show the compns. of both unmodified and I-modified films to be zinc phosphate dihydrate, Zn3(PO4)2·2H2O. Atomic force microscopy (AFM) was used to measure the morphologies of single crystalline surfaces. Morphologies of the unmodified and modified films obtained by AFM were quite similar, but subtle differences were apparent.

=> quatte c/au
L7 0 FILE CAPLUS
L8 0 FILE BIOSIS
L9 0 FILE MEDLINE
L10 0 FILE EMBASE
L11 0 FILE USPATFULL

TOTAL FOR ALL FILES
L12 0 QUATTE C/AU

=> quate c/au
L13 2 FILE CAPLUS
L14 0 FILE BIOSIS
L15 0 FILE MEDLINE
L16 0 FILE EMBASE
L17 0 FILE USPATFULL

TOTAL FOR ALL FILES
L18 2 QUATE C/AU

=> d l18 ibib abs total

L18 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2004:394539 CAPLUS
TITLE: Harmonic cantilevers for nanomechanical sensing of elastic properties
AUTHOR(S): Sahin, O.; Yaralioglu, G.; Grow, S. F.; Zappe, S. F.; Atalar, A.; **Quate, C.**; Solgaard, O.
CORPORATE SOURCE: E. L. Ginzton Laboratory, Stanford University, CA, 94305-4085, USA
SOURCE: Transducers '03, International Conference on Solid-State Sensors, Actuators and Microsystems, Digest of Technical Papers, 12th, Boston, MA, United States, June 8-12, 2003 (2003), Volume 2, 1124-1127. Institute of Electrical and Electronics Engineers: New York, N. Y.
CODEN: 69FHV2; ISBN: 0-7803-7731-1
DOCUMENT TYPE: Conference
LANGUAGE: English
AB We present a micromachined scanning probe cantilever, in which a specific higher order flexural mode is designed to be resonant at an exact integer multiple of the fundamental resonance frequency. We have demonstrated that such cantilevers enable sensing of nonlinear mech. interactions between the atomically sharp tip at the free end of the cantilever and a surface with unknown mech. properties in tapping-mode atomic force microscopy.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1999:216077 CAPLUS
TITLE: 5 x 5 2D AFM cantilever arrays a first step towards a terabit storage device
AUTHOR(S): Lutwyche, M.; Andreoli, C.; Binnig, G.; Brugger, J.; Drechsler, U.; Haberle, W.; Rohrer, H.; Rothuizen, H.; Vettiger, P.; Yaralioglu, G.; **Quate, C.**
CORPORATE SOURCE: Zurich Research Laboratory, IBM Research Division, Rueschlikon, 8803, Switz.
SOURCE: Sensors and Actuators, A: Physical (1999), A73(1-2), 89-94
CODEN: SAAPEB; ISSN: 0924-4247
PUBLISHER: Elsevier Science S.A.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB In this paper we report on the microfabrication of a 5 x 5 2D cantilever array and its successful application to parallel imaging. The 5 x 5 array with integrated force sensing and tip heating has been fabricated using a recently developed, all dry, silicon backside etching process. The levers on the array have integrated piezoresistive sensing, and are placed on a constriction in the lever to improve sensitivity. The array is scanned in x and y directions using voice coil actuators. Three addnl. voice coil z actuators are used in a triangular arrangement to approach the sample with the array chip. The system is thus leveled in the same way as an air table. We report details of the array fabrication, the x-y scanning and approach system as well as images taken with the system. The results are encouraging for the development of large-scale VLSI-Nano EMS, allowing the fabrication and operation of large AFM cantilever arrays to achieve high-data-rate Terabit storage systems.
REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> cantilever and finger and external
L19 0 FILE CAPLUS
L20 0 FILE BIOSIS
L21 0 FILE MEDLINE
L22 0 FILE EMBASE
L23 2067 FILE USPATFULL

TOTAL FOR ALL FILES
L24 2067 CANTILEVER AND FINGER AND EXTERNAL

=> file .meeting
'EVENTLINE' IS NOT A VALID FILE NAME
Enter "HELP FILE NAMES" at an arrow prompt (=>) for a list of files that are available. If you have requested multiple files, you can specify a corrected file name or you can enter "IGNORE" to continue accessing the remaining file names entered.
ENTER A FILE NAME OR (IGNORE):ignore

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	28.01	28.22
DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)	SINCE FILE ENTRY	TOTAL SESSION
CA SUBSCRIBER PRICE	-2.94	-2.94

FILE 'AGRICOLA' ENTERED AT 09:09:57 ON 16 JUL 2004

FILE 'BIOTECHNO' ENTERED AT 09:09:57 ON 16 JUL 2004

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FILE 'LIFESCI' ENTERED AT 09:09:57 ON 16 JUL 2004
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FILE 'MEDICONF' ENTERED AT 09:09:57 ON 16 JUL 2004
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FILE 'PASCAL' ENTERED AT 09:09:57 ON 16 JUL 2004
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=> cantilever and external force and finger
L25             0 FILE AGRICOLA
L26             0 FILE BIOTECHNO
L27             0 FILE CONFSCI
L28             0 FILE HEALSAFE
L29             0 FILE IMSDRUGCONF
L30             0 FILE LIFESCI
L31             0 FILE MEDICONF
L32             0 FILE PASCAL

TOTAL FOR ALL FILES
L33             0 CANTILEVER AND EXTERNAL FORCE AND FINGER

=> cantilever and (external force)
L34             0 FILE AGRICOLA
L35             1 FILE BIOTECHNO
L36             0 FILE CONFSCI
L37             0 FILE HEALSAFE
L38             0 FILE IMSDRUGCONF
L39             0 FILE LIFESCI
L40             0 FILE MEDICONF
L41            15 FILE PASCAL

TOTAL FOR ALL FILES
L42            16 CANTILEVER AND (EXTERNAL FORCE)

=> dup rem
ENTER L# LIST OR (END):l42
DUPLICATE IS NOT AVAILABLE IN 'IMSDRUGCONF, MEDICONF'.
ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE
PROCESSING COMPLETED FOR L42
L43             16 DUP REM L42 (0 DUPLICATES REMOVED)

=> d l43 ibib abs total

L43   ANSWER 1 OF 16  PASCAL  COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED.
      on STN
ACCESSION NUMBER:          2004-0279114   PASCAL
COPYRIGHT NOTICE:          Copyright .COPYRGT. 2004 INIST-CNRS. All rights
```

reserved.
TITLE (IN ENGLISH): Flank wear and process characteristic effect on system dynamics in turning
AUTHOR: LU Ming-Chyuan; KANNATEY-ASIBU Elijah JR
CORPORATE SOURCE: Dept. of Mechanical Engineering, The University of Michigan, Ann Arbor, MI 48109-2125, United States
SOURCE: Journal of manufacturing science and engineering, (2004), 126(1), 131-140, 20 refs.
ISSN: 1087-1357
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-6120B, 354000111510090160
AN 2004-0279114 PASCAL
CP Copyright .COPYRGT. 2004 INIST-CNRS. All rights reserved.
AB The dynamics of the cutting process is modeled for investigating the relationship between tool wear and sound generation during surface turning. The vibration of the tool holder, together with the cutting insert, is considered as the main source of sound associated with tool wear. In this research, the tool holder-cutting insert combination is simplified as a **cantilever** beam which is excited by an **external force** that is directly related to tool wear.
Based on this model, the displacement of the cutting tool is shown to be directly affected by tool wear and process characteristics. Simulation results show a change in the sound signal distribution over frequency as tool wear increases. A transfer function that includes the process characteristics is also developed to investigate the capability of sound and vibration signals in tool wear monitoring for a specific process. This provides critical information for sensor selection in implementing a tool failure monitoring system in reconfigurable manufacturing.

L43 ANSWER 2 OF 16 BIOTECHNO COPYRIGHT 2004 Elsevier Science B.V. on STN
ACCESSION NUMBER: 2002:35108498 BIOTECHNO
TITLE: Force spectroscopy of the leukocyte function-associated antigen-1/intercellular adhesion molecule-1 interaction
AUTHOR: Zhang X.; Wojcikiewicz E.; Moy V.T.
CORPORATE SOURCE: V.T. Moy, Department of Physiology, Univ. of Miami School of Medicine, 1600 N.W. 10th Avenue, Miami, FL 33136, United States.
E-mail: vmoy@newssun.med.miami.edu
SOURCE: Biophysical Journal, (01 OCT 2002), 83/4 (2270-2279), 47 reference(s)
CODEN: BIOJAU ISSN: 0006-3495
DOCUMENT TYPE: Journal; Article
COUNTRY: United States
LANGUAGE: English
SUMMARY LANGUAGE: English
AN 2002:35108498 BIOTECHNO
AB Interactions between leukocyte function-associated antigen-1 (LFA-1) with its cognate ligand, intercellular adhesion molecule-1 (ICAM-1) play a crucial role in leukocyte adhesion. Because the cell and its adhesive components are subject to external perturbation from the surrounding flow of blood, it is important to understand the binding properties of the LFA-1/ICAM-1 interaction in both steady state and in the presence of an external pulling force. Here we report on atomic force microscopy (AFM) measurements of the unbinding of LFA-1 from ICAM-1. The single molecule measurements revealed the energy landscape corresponding to the dissociation of the LFA-1/ICAM-1 complex and provided the basis for defining the energetic determinants of the complex at equilibrium and under the influence of an **external force**. The AFM
force measurements were performed in an experimental system consisting of an LFA-1-expressing T cell hybridoma, 3A9, attached to the end of the AFM

cantilever and an apposing surface expressing ICAM-1. In measurements covering three orders of magnitude change in force loading rate, the LFA-1/ICAM-1 force spectrum (i.e., unbinding force versus loading rate) revealed a fast and a slow loading regime that characterized a steep inner activation barrier and a wide outer activation barrier, respectively. The addition of Mg.sup.2.sup.+, a cofactor that stabilizes the LFA-1/ICAM-1 interaction, elevated the unbinding force of the complex in the slow loading regime. In contrast, the presence of EDTA suppressed the inner barrier of the LFA-1/ICAM-1 complex. These results suggest that the equilibrium dissociation constant of the LFA-1/ICAM-1 interaction is regulated by the energetics of the outer activation barrier of the complex, while the ability of the complex to resist a pulling force is determined by the divalent cation-dependent inner activation barrier.

L43 ANSWER 3 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2002-0577644 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2002 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Instability of a **cantilever** with a propeller in an incident flow
AUTHOR: GONCHARENKO V. A.; GONCHARENKO V. I.
CORPORATE SOURCE: National Technical University "KPI", Kiev, Ukraine; O. K. Antonov Aeronautical Scientific and Technical Complex, Kiev, Ukraine
SOURCE: International applied mechanics, (2002), 38(5), 635-640, 10 refs.
ISSN: 1063-7095
DOCUMENT TYPE: Journal; Translation
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
NOTE: Trad. de: Prikladnaya Mekhanika, RU, 2002, 38, 5, 137-144
AVAILABILITY: INIST-14100, 354000105354260150
AN 2002-0577644 PASCAL
CP Copyright .COPYRGT. 2002 INIST-CNRS. All rights reserved.
AB A physical explanation is given to the mechanism of back coupling of the perturbed motion of a propeller in its plane of rotation and the force in the same plane. This unusual feedback may cause a mechanical system with a propeller to self-excite in the plane of possible oscillations of its axis upon propeller reversal. Instability occurs easier at the resonance of the system when the resultant moment of **external forces** lags in phase behind the angle of attack by approximately $5/4\pi$.

L43 ANSWER 4 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2002-0593029 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2002 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Vibration suppression of a beam structure by intermediate masses and springs
AUTHOR: ALSAIF K.; FODA M. A.
CORPORATE SOURCE: Department of Mechanical Engineering, King Saud University, P.O. Box 800, Riyadh 11421, Saudi Arabia
SOURCE: Journal of sound and vibration, (2002), 256(4), 629-645, 12 refs.
ISSN: 0022-460X CODEN: JSVIAG
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English

AVAILABILITY: INIST-11530, 354000106487810030
AN 2002-0593029 PASCAL

AB A method based on the dynamic Green function has been proposed to determine the optimum values of masses and/or springs and their locations on a beam structure in order to confine the vibration at an arbitrary location. In the analysis, the beam is driven by a harmonic external excitation. The added masses on the beam and the springs attached are modelled as simple reactions that provide transverse forces to the beam. These forces act as secondary forces that reduce the response caused by the **external force**. Numerical simulation shows that the vibration of the beam can be confined in a certain region by the presence of masses and springs in best arrangement. This method is demonstrated for both a simply supported and a **cantilever** beam. An experimental set-up was designed in which a simply supported beam is excited by an electrodynamic shaker and the response of the beam is measured using an He-Ne laser system. This assures very accurate measurements and avoids any additional loading effects as in the case of accelerometers. Comparisons of the theoretical and the experimental results show good agreement.

L43 ANSWER 5 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 2001-0042478 PASCAL

TITLE (IN ENGLISH): Stiction, adhesion energy, and the Casimir effect in micromechanical systems
AUTHOR: BUKS E.; ROUKES M. L.
CORPORATE SOURCE: Condensed Matter Physics, California Institute of Technology, Pasadena, California 91125
SOURCE: Physical review. B, Condensed matter and materials physics, (2001-01-15), 63(3), 033402-033402-4
ISSN: 1098-0121 CODEN: PRBMDO
DOCUMENT TYPE: Journal; Short communication
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-144 B
AN 2001-0042478 PASCAL

AB We measure the adhesion energy of gold using a micromachined **cantilever** beam. Stress and stiffness of the beam are characterized by measuring the spectrum of mechanical vibrations and the deflection due to **external force**. We induce stiction between the beam and a nearby surface, employing capillary forces to determine the adhesion energy γ. The obtained value γ=0.06 J/m.sup.2 is a factor of 6 smaller than that predicted by idealized theory. This discrepancy may arise from surface roughness or an adsorbed layer intervening between the contacting surfaces in these mesoscopic structures.

L43 ANSWER 6 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 2001-0346034 PASCAL

TITLE (IN ENGLISH): Modified atomic force microscope applied to the measurement of elastic modulus for a single peptide molecule
AUTHOR: PTAK Arkadiusz; TAKEDA Seiji; NAKAMURA Chikashi; MIYAKE Jun; KAGESHIMA Masami; JARVIS Suzanne P.; TOKUMOTO Hiroshi

CORPORATE SOURCE: Tissue Engineering Research Center (TERC), AIST, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8562, Japan; JRCAT, 1-1-4 Higashi, Tsukuba, Ibaraki 305-8562, Japan
SOURCE: Journal of applied physics, (2001-09-15), 90(6), 3095-3099
ISSN: 0021-8979 CODEN: JAPIAU
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-126
AN 2001-0346034 PASCAL

AB A modified atomic force microscopy (AFM) system, based on a force modulation technique, has been used to find an approximate value for the elastic modulus of a single peptide molecule directly from a mechanical test. For this purpose a self-assembled monolayer built from two kinds of peptides, reactive (able to anchor to the AFM tip) and nonreactive, was synthesized. In a typical experiment a single C.sub.3K.sub.3.sub.0C (C=cysteine, K=lysine) peptide molecule was stretched between a Au(111) substrate and the gold-coated tip of an AFM **cantilever** to which it was attached via gold-sulfur bonds. The amplitude of the **cantilever** oscillations, due to an **external force** applied via a magnetic particle to the **cantilever**, was recorded by a lock-in amplifier and recalculated into stiffness of the stretched molecule. A longitudinal Young<right single quotation mark>s modulus for the α-helix of a single peptide molecule and for the elongated state of this molecule has been estimated. The obtained values; 1.2±0.3 and 50±15 GPa, for the peptide α-helix and elongated peptide backbone, respectively, seem to be reasonable comparing them to the Young<right single quotation mark>s modulus of protein crystals and linear organic polymers. We believe this research opens up a means by which scientists can perform quantitative studies of the elastic properties of single molecule, especially of biologically important polymers like peptides or DNA. .COPYRGT. 2001 American Institute of Physics.

L43 ANSWER 7 OF 16 PASCAL on STN
ACCESSION NUMBER: 2001-0133537 PASCAL

TITLE (IN ENGLISH): Effect of an Atomic Scale Protrusion on a Tip Surface on Molecular Stick-Slip Motion and Friction Anisotropy in Friction Force Microscopy
AUTHOR: OHZONO Takuya; FUJIHIRA Masamichi
CORPORATE SOURCE: Department of Biomolecular Engineering, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku, Yokohama 226-8501, Japan
SOURCE: Japanese Journal of Applied Physics, Part I : Regular papers, short notes & review papers, (2000-10-15), 39(10), 6029-6034
ISSN: 0021-4922 CODEN: JAPNDE
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-9959
AN 2001-0133537 PASCAL

AB A molecular dynamics (MD) method is used to simulate the molecular stick-slip motion and the friction anisotropy observed experimentally

between an atomic force microscope (AFM) tip and an ordered monolayer of n-alkane chains which tilt in one of six equivalent stable directions. A slider with a single atomic scale protrusion, connected to an **external force** control unit via three orthogonal springs, is used to model the AFM tip apex with **cantilever** springs under feedback regulation of the applied normal force. Although there is almost no interfacial commensurability between the tip atomic lattice and the sample molecular lattice, molecular lattice-resolved images are observed due to molecular scale stick-slip motion when the size of the protrusion is comparable to the molecular lattice constant. The present MD simulation can provide an explanation of why we can see a molecular lattice in contact AFM.

L43 ANSWER 8 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2000-0355077 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 American Institute of Physics. All rights reserved.
TITLE (IN ENGLISH): Experimental determination of the mechanical impedance of atomic force microscopy **cantilevers** in fluids up to 70 kHz
AUTHOR: SCHERER Marc P.; FRANK Gerhard; GUMMER Anthony W.
CORPORATE SOURCE: University of Tubingen, Department of Otolaryngology, Section for Physiological Acoustics and Communication, Silcherstr. 5, 72076 Tubingen, Germany
SOURCE: Journal of applied physics, (2000-09-01), 88(5), 2912-2920
ISSN: 0021-8979 CODEN: JAPIAU
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-126

AN 2000-0355077 PASCAL
CP Copyright .COPYRGT. 2000 American Institute of Physics. All rights reserved.
AB The high-frequency dynamical response of **cantilevers** used in atomic force microscopy (AFM) to an **external force** is important for applications such as dynamic AFM modes and dynamic mechanical measurements on biological tissues. In this paper we present a novel method for experimentally determining the mechanical driving-point impedance of an AFM **cantilever** up to frequencies of at least 70 kHz. A frequency-independent, point force was achieved by applying an electric field between the **cantilever** and a sharpened steel electrode positioned near (10 μm) the tip of the **cantilever**. The velocity of the **cantilever** in response to the force was measured with a laser interferometer. The method was tested in air and in tetrachloromethane (CCl.sub.4), a nonpolar, nondissociating fluid. The results agree with theoretical predictions. In addition, the mechanical impedance of a **cantilever** near a flat surface was measured. .COPYRGT. 2000 American Institute of Physics.

L43 ANSWER 9 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2000-0199629 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): An elastic-plastic stress analysis in a thermoplastic composite **cantilever** beam
AUTHOR: SAYMAN O.; KAYRICI M.
CORPORATE SOURCE: Department of Mechanical Engineering, Dokuz Eyluel University, Bornova, Izmir, Turkey
SOURCE: Composites science and technology, (2000), 60(4), 623-631, 14 refs.

ISSN: 0266-3538 CODEN: CSTCEH
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-14173, 354000086585370150
AN 2000-0199629 PASCAL

AB In the present study an analytical elastic-plastic stress analysis is carried out for a low-density homogeneous polyethylene thermoplastic **cantilever** beam reinforced by Cr-Ni steel fibers. The beam is loaded by a constant single force at its free end. The expansion of the plastic region and the residual stress component of σ.sub.N are determined for 0, 15, 30 and 45° orientation angles. Yielding begins for 0 and 45° orientation angles at the upper and lower surfaces of the beam at the same distances from the free end. However, it starts first at the upper surface for 15 and 30° orientation angles. The elastic- plastic analysis is carried out for both the plastic region which spreads only at the upper surface and the plastic region which spreads at the upper and lower surfaces together. The residual stress components are obtained after releasing the **external force**. The distributions of the residual stress components of σ.sub.x and τ.sub.x.sub.y are also determined. The intensity of the residual stress component is maximum at the upper and lower surfaces of the beam, but the residual stress component of τ.sub.x.sub.y is maximum on or around the x-axis. The beam can be strengthened by using the residual stresses. The distance between the plastically collapsed points and the free end is calculated for the same load in the beam for 0, 15, 30 and 45° orientation angles.

L43 ANSWER 10 OF 16 PASCAL
on STN
ACCESSION NUMBER: 2000-0435274 PASCAL

TITLE (IN ENGLISH): MEMS IC test probe utilizing fritting contacts
Design, test, integration, and packaging of MEMS/MOEMS : Paris, 9-11 mai 2000
AUTHOR: ITOH T.; KATAOKA K.; ENGELMANN G.; WOLF J.; EHRMANN O.; REICHL H.; SUGA T.
COURTOIS Bernard (ed.); CRARY Selden B. (ed.); GABRIEL Kaigham J. (ed.); KARAM Jean Michel (ed.); MARKUS Karen (ed.); TAY Andrew A.O. (ed.)
CORPORATE SOURCE: Research Center for Advanced Scinece and Technology, The University of Tokyo, Komaba 4-6-1, Meguro-ku, Tokyo 153-8904, Japan; Fraunhofer Institut fuer Zuverlaessigkeit und Mikrointegration Gustav-Meyer-Allee 25, 13355 Berlin, Germany, Federal Republic of
International Society for Optical Engineering, Bellingham WA, United States (patr.)
SOURCE: SPIE proceedings series, (2000), 4019, 244-249, 8 refs.
Conference: Design, test, integration, and packaging of MEMS/MOEMS. Conference, Paris (France), 9 May 2000
ISSN: 1017-2653
ISBN: 0-8194-3645-3
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-21760, 354000090088980290
AN 2000-0435274 PASCAL

AB This paper describes how a micro-electro-mechanical system (MEMS) probe can be applied to IC testing. MEMS probe cards are requisite to tests of higher pad-density and smaller pad-pitch chips with high-speed signals above 1 GHz. In addition, if a microactuator is integrated into each probe, we can realize a novel probe card in which contacts can directly be switched on and off. The critical problem of the micromachined probe cards, however, is that each micromachined probe cannot generate or endure the force required to break the oxide on an Al pad surface mechanically. Furthermore, for the design of the switching probe card, the force necessary to disconnect the contact should be clarified. We experimentally found that the fritting makes it possible to get low resistance contact to Al pads without applying **external forces**. Using the Au bump, the contact resistance to Al pads was about 0.3 Ω and the disconnection force was around 0.3 mN. In this report, we have carried out analytical calculation to estimate the performance of three different **cantilever**-type microactuator mechanism and to select and design the microactuator suitable for the switching probe card.

L43 ANSWER 11 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 1998-0184207 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1998 American Institute of Physics. All rights reserved.
TITLE (IN ENGLISH): Mechanical parametric amplification in piezoresistive gallium arsenide microcantilevers
AUTHOR: DANA A.; HO F.; YAMAMOTO Y.
CORPORATE SOURCE: ERATO Quantum Fluctuation Project, E. L. Ginzton Laboratory, Stanford, California 94305; Sclumberger ATE, San Jose, California 95110-1397; ERATO Quantum Fluctuation Project, E. L. Ginzton Laboratory, Stanford, California 94305; NTT Basic Research Laboratories, Atsugishi, Kanagawa, Japan 243-01
SOURCE: Applied physics letters, (1998-03-09), 72(10), 1152-1154
ISSN: 0003-6951 CODEN: APPLAB
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-10020

AN 1998-0184207 PASCAL
CP Copyright .COPYRGT. 1998 American Institute of Physics. All rights reserved.
AB Preamplification of mechanical signals in **external force** detection systems can improve overall sensitivity in a case where sensitivity is limited by secondary detection noise. We report experimental data on degenerate and nondegenerate mechanical parametric amplification in GaAs piezoresistive atomic force microscopy **cantilevers** due to an inherent mechanical nonlinearity. The mechanical nonlinearity is estimated to be a result of curvature at the **cantilever** base. Characteristics of parametric amplification such as phase sensitive gain, small signal gain, gain saturation, and self-oscillation have been studied. A small signal phase sensitive gain of 19.5 dB was observed for the degenerate parametric amplifier. .COPYRGT. 1998 American Institute of Physics.

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ACCESSION NUMBER: 1999-0017293 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1999 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Reshaping as a 3D fabrication technique Materials and device characterization in

micromachining : Santa Clara CA, 21-22 September 1998
AUTHOR: OKYAR M. M.; XI QING SUN; CARR W. N.
FRIEDRICH Craig R. (ed.); VLADIMIRSKY Yuli (ed.)
CORPORATE SOURCE: New Jersey Institute of Technology, Newark NJ 07102, United States
International Society for Optical Engineering, Bellingham WA, United States (patr.)
SOURCE: SPIE proceedings series, (1998), 3512, 386-397, 15 refs.
Conference: Materials and device characterization in micromachining. Conference, Santa Clara CA (United States), 21 Sep 1998
ISSN: 1017-2653
ISBN: 0-8194-2971-6
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-21760, 354000070154650410
AN 1999-0017293 PASCAL

AB In this work, a new micromachining technology, namely reshaping, which combines advantages of two-dimensional IC fabrication with the third dimension of the mechanical world, is investigated in detail. With the new technology, surface micromachined and released polysilicon structures are deformed with **external forces** and then they are annealed to any desired 3D shape by Joule heating generated by the current through the devices. A similar technique was proposed before, however a detailed investigation is given in this work. Other available 3D fabrication techniques (e.g. LIGA) are expensive and there are still many challenges to overcome. In order to understand the reshaping process, polysilicon layers, whose crystallographical structure was modified by doping and annealing, were utilized. U-shaped **cantilever** beam microactuators were fabricated, reshaped and tested. Reshaping process was carried out at varying power levels with varying current pulse durations. Experimental results showed that microstructures in the desired shape with the optimized elastic properties can be obtained by controlling recrystallization, grain growth and plastic deformation parameters, which play a major role in reshaping.

L43 ANSWER 13 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 1998-0357651 PASCAL

TITLE (IN ENGLISH): Bimorph-based piezoelectric air acoustic transducer : model
AUTHOR: KUGEL V. D.; BAOMIN XU; ZHANG Q. M.; CROSS L. E.
CORPORATE SOURCE: Materials Research Laboratory, The Pennsylvania State University, University Park, PA 16802, United States
SOURCE: Sensors and actuators. A, Physical, (1998), 69(3), 234-242, 9 refs.
ISSN: 0924-4247
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Switzerland
LANGUAGE: English
AVAILABILITY: INIST-19425A, 354000072496680050
AN 1998-0357651 PASCAL

AB A new type of bimorph-based piezoelectric air transducer with the working frequency range of 200-1000 Hz has recently been developed [B. Xu. Q. Zhang, V.D. Kugel. L.E. Cross, Piezoelectric air transducer for active noise control, Proc. SPIE, 2717 (1996) 388-398]. In the present work.

basic acoustic characteristics of this device and its piezoelectric elements are analyzed. To model the vibration spectrum of the transducer, a one-dimensional approach is developed where inertia, elastic and damping forces are included. Analytical equations describing mechanical vibrations and electrical impedance of piezoelectric bimorph **cantilevers** under **external forces** are derived. In order to describe various losses in the transducer, complex piezoelectric, dielectric, and elastic constants are used. Results of the modeling are in good accord with experimental data. The suggested model can be used for device optimization.

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ACCESSION NUMBER: 1997-0006082 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1996 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Theoretical analysis of large deformation simultaneous tearing and peeling of elastoplastic materials
AUTHOR: LIU J. H.; ATKINS A. G.; JERONIMIDIS G.
CORPORATE SOURCE: Department of Engineering, University of Reading, United Kingdom
SOURCE: Proceedings of the Institution of Mechanical Engineers. Part C. Mechanical engineering science, (1996), 210(5), 433-444, 13 refs.
ISSN: 0263-7154 CODEN: MESCEO
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-6044A3, 354000066926940030

AN 1997-0006082 PASCAL
CP Copyright .COPYRGT. 1996 INIST-CNRS. All rights reserved.
AB Simultaneous tearing and peeling of multiple strips is theoretically investigated using the large deflection theory of **cantilevers** made of elastoplastic material with linear strain hardening. The relationship between the fracture toughness and the curvature at the fracture propagation front is obtained for general cases. It is shown that for the moment loading case, the non-dimensional external moment, m.sub.1, during tearing and peeling along straight paths, is a constant and is independent of the initial beam length L.sub.0. With concentrated force loading, the non-dimensional force f will reach a constant value f= f.sub.m during propagation. It is shown that f.sub.m is almost the same for both initially straight and pre-bent beams, and decreases with an increase in the **external force** loading angle Φ.
For initially straight beams, when the non-dimensional fracture toughness, D, is small, f.sub.m may be less than the initiation force for fracture. F.sub.m/H does not increase linearly with an increase in the beam width B.sub.0 and decreases at large B.sub.0 after it passes through a peak value. Comparison is made with experimental results for the tearing of ductile metal sheets along straight paths and the tearing fracture toughness value is found, including a method that uses propagation crack front curvature alone, without additional reference to the tearing force. However, the accuracy of the curvature at the crack propagation front has a large effect on the estimation offracture toughness. High work-hardening and/or low toughness materials have no rapid change of curvature away from the crack front so that good estimates are possible and vice versa for low work-hardening solids.

L43 ANSWER 15 OF 16 PASCAL COPYRIGHT 2004 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 1995-0590295 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1995 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): A comparison of shaped piezoelectric actuators for

divergence control
AUTHOR: BALL J. K.; DONES J. D.
CORPORATE SOURCE: USAFA, USAF acad., dep. eng. mechanics, United States
SOURCE: Journal of intelligent material systems and structures, (1995), 6(5), 598-609, 10 refs.
ISSN: 1045-389X
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-22109, 354000058493860020
AN 1995-0590295 PASCAL

AB The characteristics and effectiveness of shaped piezo-actuators for use in controlling the divergence of a simplified forward swept wing model are analytically investigated. The forward swept wing is modeled as a simplified **cantilever** beam with surface mounted piezo-actuators on the upper surface of the beam. A constant electric field is applied to the actuator inducing a constant **external force** on the wing, and the effects of actuator location, size, thickness, and shape are evaluated using the principle of virtual work by maximizing the modal amplitude of the first bending mode. For control purposes, strain at the wing root is used as an error signal to minimize the beam deflection. Results suggest that the optimum actuator size should span the entire wing. The required actuator thickness for divergence control decreases with increasing airspeed due to the effectiveness softening of the wing in the presence of air loads. A uniform rectangular actuator is more effective for controlling divergence; however, a linearly shaped actutor is more efficient from the standpoint of control effectiveness per actuator weight. Application is currently limited by the large thicknesses and applied voltages required by the actuators to achieve effective divergence control. However, this investigation suggests that, because of the softening of the wing near divergence, only a small control effort is required to deform the wing thus allowing the airstream to act as the power source for control actuation.

L43 ANSWER 16 OF 16 PASCAL
on STN
ACCESSION NUMBER: 1996-0054047 PASCAL

TITLE (IN ENGLISH): Field-emitter cathode for acceleration sensors
AUTHOR: HARIZ A.; KIM H. G.; HASKARD M. R.; CHUNG I. J.
CORPORATE SOURCE: Univ. South Australia, microelectronics cent., The Levels SA 5095, Australia
SOURCE: Journal of micromechanics and microengineering, (1995), 5(4), 282-288, 13 refs.
ISSN: 0960-1317
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-22483, 354000055039420040
AN 1996-0054047 PASCAL

AB Vacuum microelectronics is an emerging and rapidly evolving technology. Characterized by field emission in vacuum microchambers, it has found applications in the display field, and more recently in sensor technology. In this paper we seek to report on a novel multidimensional method of utilizing field emission in acceleration sensors. Emission currents are directly related to, among other parameters, the distance separating the emission cathode and anode. When either or both electrodes are micromachined in a **cantilever** beam capable of deflection under the influence of an **external force**, the

emission current detected will be a direct measure of force magnitude. Furthermore, we propose a design that will allow measurements of force components in three-dimensions. We present details of fabrication methods and theoretical concepts describing the mechanism proposed.